Wolf completes space walk, prepares to come home

U.S. Astronaut David Wolf completed four months of research on the Mir Space Station this past week, awaiting the arrival of *Endeavour* and the transfer of Astronaut Andy Thomas to take his place as the final American to live and work on the Mir.

After wrapping up a mission virtually devoid of systems problems, Wolf capped off his stay on the Mir with a four-hour space walk on Jan. 14 with Mir 24 Commander Anatoly Solovyev. Wolf used a portable spectrometer to measure the degree of wear and tear on Mir's exterior.

Mir's first component, the Core Module, was launched 12 years ago. Wolf measured the deterioration of the exterior surface of the Kvant-2 module during his space walk. Kvant-2 was launched in 1989. The data will be studied by engineers involved in the fabrication of space hardware for future facilities.

"When I was nine years old and Ed White did the first American space walk from a Gemini capsule, I thought that's what I wanted to do. It was worth the 32-year wait," Wolf said. "When you clip that tether on outside and slip on outside the vehicle and see the whole perspective of what's really happening here, this vehicle and the Earth, it goes beyond any expectation."

During his final status report, Wolf summed up what Andy Thomas could expect. "He's in for the time of his life," Wolf said.

Once he returns to Earth, Wolf will begin several weeks of debriefings and medical rehabilitation as did the five other U.S. astronauts who preceded him on the Mir. Wolf's tenure extended the continuous U.S. presence in space on the Mir to 22 months, starting with the arrival of Shannon Lucid in March 1996. He said he is looking forward to home.

"I miss everything I think of about Earth," Wolf said, "you just realize what a great place it is after you're away from it this long. Of course, when I'm back on Earth I'll miss everything up here, too. I've got my heart set now on being on Earth," Wolf noted. "But there's a lot to do on our wonderful planet Earth."

Wolf also had a special thanks for everyone at NASA who has helped support his mission.

"This is a wonderful team that we are a part of and it has been a privilege to work with all of you, and to continue to work with all of you as we move into the International Space Station era. There will be difficulties and we will have to attack those problems with the same enthusiasm and energy that we have attacked all the problems in the past. And it will bring out our best, no question. So, see you on Earth, it's been a wonderful flight and a difficult flight and that's the best part of it."

Morgan to join astronaut candidates

NASA has selected Barbara Morgan, an elementary school teacher from McCall, Idaho, to join the next astronaut candidate class as a mission specialist, and she has accepted.

In a decision that re-emphasizes the importance of NASA's commitment to education and its unique position to improve science, mathematics, and technology education, NASA Administrator Daniel S. Goldin said Jan. 16 that it is appropriate to include educator mission specialists in the astronaut corps.

"This is a signal that we're trying to do the maximum space research to benefit the American people and to inspire people," Goldin said. "When we bring people into the astronaut corps, they will be fully trained. One of the issues I personally had with the Teacher in Space Program was the lack of full training. That is why Barbara Morgan is going to become a fully trained mission specialist."

In addition to meeting the astronaut selection requirements, mission specialists with education and teaching backgrounds in science, mathematics and technology will be selected and trained in the astronaut corps. These mission specialists will carry out educational programs in addition to their other flight duties.

NASA has no plans to fly a civilian-observer on the space shuttle. Barbara Morgan has been named to the next class of astronauts and will be the first to train under a new Mission Specialist Educator category. The members of the 1998 astronaut candidate class are scheduled to arrive at JSC this summer.

Morgan was selected as the backup to Teacher in Space Christa McAuliffe in 1985. Following the *Challenger* accident, Morgan was named the Teacher in Space Designee and has worked closely with NASA's Education Office.

In future astronaut selection processes, consideration will be given to candidates who could also be Mission Specialist Educators.

"We are not looking for educators only," Goldin said. "They must be scientists and do science, and then education as part of the process, as with biologists and geologists."

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CONGRESSIONAL VISIT—NASA Administrator Daniel S. Goldin visits the X-38 at JSC during a recent congressional visit by Sen. Robert Kerrey, D-Neb., who has been a key player in the congressional debate of the International Space Station. X-38 Project Manager John Muratore briefed the group on the X-38, a JSC designed and built vehicle that will provide assured crew return capability for the International Space Station. Kerrey and members of his staff visited a number of JSC facilities, including the Shuttle Mission Simulator and the Advanced Life Support Test Chamber in Bldg. 7.

Galileo begins extended mission

The Galileo spacecraft last week completed a maneuver to prepare itself for the upcoming Europa encounter on Feb. 10, part of its extended mission to further investigate that planet-sized Jovian moon.

The spacecraft recently began a two-year extended mission, known as the Galileo Europa Mission, which includes a total of eight Europa flybys, four of Callisto, and one or two of Io, depending on spacecraft health.

Galileo also is sending back to Earth high-resolution pictures taken during the Dec.16 Europa encounter. That flyby was the closest ever to be performed by Galileo, with the spacecraft dipping down to 124 miles above the icy moon's surface. Galileo is returning information on the interaction between Europa and Jupiter's magnetic and electric field environment.

Members of the Galileo flight team are analyzing data from a test performed Jan. 16, which they hope will shed light on the cause of two recent incidents of unusual behavior by the spacecraft. One irregularity occurred during the spacecraft's Dec. 16, flyby of Europa, and the other after the flyby. Both involved the attitude control subsystem which controls where the spacecraft and scan platform are pointing.

Team members believe the cause may have been one of the spacecraft's two gyroscopes. The gyroscopes are used to point the spacecraft when very precise pointing control and knowledge of the spacecraft's position and orientation are needed, usually for camera and other remote sensing science observations or for maneuvers that adjust the spacecraft's flight path. While the investigation continues, the spacecraft has resumed normal transmission to Earth of pictures and other science information stored on its onboard tape recorder.

The anomalies were not considered serious, but did cause a temporary slowdown in the data rate to Earth.

NASA renames enterprise for Earth Science

NASA last week renamed the Mission to Planet Earth enterprise the Earth Science enterprise to more clearly convey the goals of the program.

The Earth Science enterprise is one of the four strategic enterprises of the agency, responsible for a long-term, coordinated research effort to study the total Earth system and the effects of natural and human-induced changes on the global environment.

"We feel that 'Earth Science' more clearly conveys to the American people the goals of our program, and more directly focuses on the research that we're conducting," Acting Associate Administrator for Earth Science William Townsend said. "1998 will include several major launches in the enterprise, including the first Earth Observing System missions, and we are pleased to enter this era with the new name."

The Earth Science enterprise is pioneering the emerging discipline of Earth system science, with a near-term emphasis on global climate change. Earth science research capabilities under development will yield a variety of new scientific understandings and practical benefits to humankind. The goals of the Earth Science enterprise are to expand scientific knowledge of the Earth system using NASA's unique vantage points of space, aircraft, and in situ platforms, creating an international capability to forecast and assess the health of the Earth system; to widely disseminate information about the Earth system; and to enable the productive use of Earth science results and related technology in the public and private sectors.

The title "Mission to Planet Earth" originated 10 years ago in a report on future directions for the U.S. civil space program by a commission led by former astronaut Dr. Sally Ride. The term and the concept of looking at Earth as NASA looks at other planets were furthered by the 1990 Report of the Advisory Committee on the Future of the U.S. Space Program, prepared by a team of experts chaired by Dr. Norman Augustine. Since that time, NASA has organized its activities into four strategic enterprises, including Human Exploration and Development of Space, Aeronautics and Space Transportation, and Space Science.

NEAR tests instruments on close swing by Earth

NASA's Near Earth Asteroid Rendezvous spacecraft, built by The Johns Hopkins University Applied Physics Laboratory in Laurel, Md., became the first interplanetary spacecraft to be seen with the naked eye when it swung by Earth Jan. 22-23.

The spacecraft's solar panels reflected the Sun's rays onto the Earth in a greeting as it flew by for an adjustment of its trajectory to correctly align the spacecraft for a rendezvous with asteroid 433 Eros, its mission target.

Launched Feb. 17, 1996, NEAR completed a flyby of the asteroid Mathilde in June 1997, then began its return to Earth. The spacecraft zipped past Earth over the Pacific Ocean traveling at about 20,000 mph. NEAR scientists and engineers used the swing-by as an opportunity to test performance and calibration of the spacecraft's six instruments and to practice coordinated multi-instrument observations of the type that will be used at Eros.

NASA commits to second X-34 vehicle

NASA has modified its X-34 contract with Orbital Sciences Corp., Dulles, Va., to produce a second flight vehicle for the X-34 Program.

"The purpose of a second vehicle is to reduce risk to the X-34 program," said deputy program manager Mike Allen of Marshall Space Flight Center. "One of the lessons we learned from the Clipper Graham program is that it is desirable to have a second flight vehicle available, especially if it can be acquired at a relatively low cost." Clipper Graham was a previous technology demonstrator that NASA flew four times in 1996, until it was destroyed during landing.

Under the new arrangement, X-34 test objectives are being expanded, adding, for example, unpowered tests to the flight profile. A second vehicle also will provide flexibility in demonstrating various technologies, allowing testing that requires repetitive flights to continue at the same time as tests which require significant, time-consuming changes to the vehicle, Allen said.

In August 1996 NASA entered into a $50 million contract with Orbital Sciences Corp. to design, build and test-fly the X-34, a small, reusable technology demonstrator. An additional $10 million was committed by NASA to be spent in direct support of X- 34 by NASA and other government agencies. Now the contract has been increased by $7.7 million to purchase long lead-time hardware, including a new wing, fuselage, avionics set, hydraulic pump and actuator system, and more. NASA has committed $2 million more for the government to provide additional testing and analysis and a second leading-edge thermal protection system.

The X-34 is a single-engine rocket capable of flying eight times the speed of sound and reaching an altitude of 250,000 feet, the X-34 is designed to bridge the gap between the earlier Clipper Graham, or DC-XA, subsonic demonstrator vehicle, and the larger, more advanced X-33.

This artist's concept shows a future X-34 vehicle during a flight test.